

1 **CLAIMS**

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3 1. A method comprising:

4 identifying a set of commands to be submitted to a processing unit;

5 selecting a subset of the set of commands;

6 submitting the subset of the set of commands to the processing unit for

7 processing; and

8 analyzing processing performed by the processing unit in response to the

9 subset of the set of commands.

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11 2. A method as recited in claim 1, wherein the analyzing comprises

12 measuring an amount of time taken for the subset of the set of commands to be

13 processed.

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15 3. A method as recited in claim 1, wherein the analyzing comprises

16 showing how a scene would be drawn using only the subset of the set of

17 commands.

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19 4. A method as recited in claim 1, wherein the processing unit

20 comprises a graphics processing unit, and wherein the set of commands comprises

21 commands to be submitted to the graphics processing unit to have a frame drawn.

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23 5. A method as recited in claim 1, wherein the set of commands were

24 captured as they were previously submitted to the processing unit.

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1 6. A method as recited in claim 5, further comprising:
2 setting the processing unit, prior to submitting the subset of the set of
3 commands to the processing unit, to a particular state, wherein the particular state
4 is a same state as the processing unit was in at the time capture of the set of
5 commands began.

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7 7. A method as recited in claim 1, further comprising modifying one or
8 more of the subset of the set of commands prior to submitting the subset of the set
9 of commands to the processing unit.

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11 8. A method as recited in claim 1, wherein the processing unit
12 comprises a graphics processing unit, the method further comprising:

13 analyzing the set of commands;

14 determining, based on the analysis of the set of commands, whether one or
15 more recommendations for using the graphics processing unit are violated by the
16 set of commands;

17 if one or more recommendations are violated by the set of commands, then:

18 selecting one of the violated recommendations;

19 determining how much faster the frame could have been drawn if the
20 selected recommendation had not been violated; and

21 issuing a warning identifying both the selected recommendation that
22 has been violated and how much faster the frame could have been drawn if
23 the selected recommendation had not been violated.

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1 9. One or more computer readable media having one or more
2 instructions that, when executed by one or more processors, causes the one or
3 more processors to:

4 identify a stream of commands previously submitted to a processing unit;
5 modify the stream of commands;
6 submit the modified stream of commands to the processing unit; and
7 determine a difference between a first amount of time required by the
8 processing unit to process the stream of commands and a second amount of time
9 required by the processing unit to process the modified stream of commands.

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11 10. One or more computer readable media as recited in claim 9, wherein
12 the processing unit comprises a graphics processing unit, wherein the stream of
13 commands comprises commands previously submitted to the graphics processing
14 unit to have a frame of video drawn, wherein the first amount of time required by
15 the processing unit to process the stream of commands comprises the amount of
16 time required by the graphics processing unit to draw the frame using the stream
17 of commands, and wherein the second amount of time required by the processing
18 unit to process the modified stream of commands comprises the amount of time
19 required by the graphics processing unit to draw the frame using the modified
20 stream of commands.

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22 11. One or more computer readable media as recited in claim 9, wherein
23 to modify the stream of commands is to remove one or more redundant
24 commands.
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1 12. One or more computer readable media as recited in claim 9, wherein
2 to modify the stream of commands is to change one or more instructions of an
3 internal program of the processor to reveal a value of an internal variable of the
4 internal program.

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6 13. One or more computer readable media as recited in claim 9, wherein
7 the stream of commands were captured as they were previously submitted to the
8 processing unit, and wherein the instructions further cause the one or more
9 processors to set the processing unit, prior to submission of the modified stream of
10 commands to the processing unit, to a particular state, wherein the particular state
11 is a same state as the processing unit was in at the time capture of the stream of
12 commands began.

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14 14. One or more computer readable media as recited in claim 9, wherein
15 the instructions further cause the one or more processors to:

16 analyze the stream of commands;
17 determine, based on the analysis, whether one or more recommendations
18 for using the processing unit are violated by the stream of commands;

19 if one or more recommendations are violated by the stream of commands,
20 then:

21 use, as the modified stream of commands, the stream of commands
22 as modified to no longer violate a selected one of the one or more
23 recommendations;

24 issue a warning identifying both the selected recommendation that
25 had been violated and an indication of the difference.

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2 **15.** One or more computer readable media having one or more
3 instructions that, when executed by one or more processors, causes the one or
4 more processors to:

5 capture a state of a graphics processing unit;

6 capture a plurality of commands submitted to the graphics processing unit
7 in order to draw a frame of video; and

8 save both the captured state and the captured plurality of commands.
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10 **16.** One or more computer readable media as recited in claim 15,
11 wherein the one or more instructions further cause the one or more processors to
12 perform the captures and save in response to a request to capture the frame,
13 wherein the request is received from a remote computing device.
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15 **17.** One or more computer readable media as recited in claim 15,
16 wherein to capture the state of the graphics processing unit is to obtain the settings
17 of all registers of the graphics processing unit.
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19 **18.** One or more computer readable media as recited in claim 15,
20 wherein the one or more instructions further cause the one or more processors to
21 capture timing data regarding how fast portions of the frame of video are drawn.
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1 **19.** One or more computer readable media as recited in claim 15,
2 wherein to capture the plurality of commands is to:

3 identify a memory location referenced by one of the plurality of commands;
4 and
5 capture the contents of the memory location.
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7 **20.** One or more computer readable media as recited in claim 19,
8 wherein to capture the plurality of commands is further to:

9 determine whether the memory location was referenced by a previous one
10 of the plurality of commands;

11 if the memory location was not referenced by a previous one of the
12 plurality of commands, then capture the contents of the memory location; and

13 if the memory location was referenced by a previous one of the plurality of
14 commands, then check whether the contents of the memory location are the same
15 as the contents of the memory location when the memory location was referenced
16 by the previous command, and capture the contents of the memory location only if
17 the contents of the memory location are not the same as the contents of the
18 memory location when the memory location was referenced by the previous
19 command.
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